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Preference for Leisure Items Over Edible Items in Individuals with Dementia: A Replication

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Author Note

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Abstract

We replicated previous research in which adults with dementia tended to show a preference for leisure items over edible items when presented in the same array. Additionally, we conducted engagement analyses with the highest, middle, and lowest preference leisure items to determine whether relative preference corresponded to engagement in the natural environment. The most highly preferred stimulus for six out of seven participants was a leisure item, and for each of those six the top three preferred stimuli were leisure stimuli. For four participants, the most preferred stimulus also produced the longest duration of engagement. We discuss the issues we encountered when conducting preference assessments with adults with intact vocal verbal repertoires, and suggest potential explanations for the displacement of edibles by leisure stimuli in older adults with dementia.

Keywords: Alzheimer's disease, Dementia, Engagement, Major Neurocognitive Disorder, Preference Assessment

Preference for Leisure Items Over Edible Items in Individuals with Dementia: A Replication

Stimulus preference assessments have been used extensively with individuals with intellectual disabilities (Tullis et al., 2011) and more recently, have been used for determining the preferences of adults with dementia (e.g., Garcia, Feliciano, & Ilem, 2018; Raetz, LeBlanc, Baker, & Hilton, 2013). As preference assessments do not require a participant to engage in vocal-verbal behavior, they can be conducted with people who have impairments in communication. Deterioration in language is one of the possible diagnostic criteria for dementia in *The Diagnostic and Statistical Manual of Mental Disorders - 5th ed.* (DSM–5; American Psychiatric Association, 2013) and Alzheimer's disease accelerates the rate of decline in vocal-verbal behavior in comparison to healthy aging adults (Kemper, Thompson, & Marquis, 2001). It has been estimated that the prevalence of dementia will double every 20 years (Prince et al., 2013); therefore, research to identify best care practice for adults with dementia with impaired vocal-verbal repertoires is of particular societal importance.

One aspect of best care for adults with dementia is increasing engagement in leisure activities. The results from preference assessments may indicate potential reinforcers for use in behavioral interventions. Highly preferred stimuli may also be used as part of environmental enrichment programs to increase engagement by presenting stimuli non-contingently in the natural environment. Increasing client engagement is a particularly important goal for clients with dementia because it has been found that people living in long-term care facilities can spend up to 87% of their time unengaged (Burgio et al., 1994). Increasing engagement with leisure activities for individuals with dementia is of particular value because higher rates of engagement not only increase life expectancy (Agahi, Silverstein, & Parker, 2011), but may also alleviate symptoms of depression (Cheng, Chow, Edwin, & Chan, 2012), reduce challenging behavior (Kolanowski, Fick, & Buettner, 2009), and slow the rate of dementia progression (Cheng, Chow, Song, Edwin, & Lam, 2014).

There is generally a preference for edible items over leisure items in individuals with intellectual and developmental disabilities when the two types of stimuli are presented in the same assessment (Bojak & Carr, 1999; Conine & Vollmer, 2019; DeLeon, Iwata, & Roscoe, 1997). Virués-Ortega, Iwata, Nogales-González, and Frades (2012) conducted paired stimulus preference assessments with 14 individuals with moderate to severe dementia. In contrast to previous findings with people with intellectual and developmental disabilities, Virués-Ortega et al. found that individuals with dementia showed a preference for leisure items over edible items.

To confirm the results from a preference assessment, the reinforcing value of preferred stimuli can also be determined through reinforcer assessments. For example, Virués-Ortega et al. (2012) conducted reinforcer assessments with three participants that resulted in an increase in behavior when the stimuli identified as preferred were delivered contingently. However, the validity of the preference assessment results may also be determined through measuring the duration that the individual engages with stimuli when they are presented outside of the preference assessment format. Raetz et al. (2013) conducted engagement analyses with adults with dementia using the highest, middle, and lowest ranked stimuli from preference assessments. Five out of seven participants demonstrated higher levels of engagement with the highest ranked stimuli than with the lowest ranked stimuli. Engagement analyses can confirm whether the stimuli identified as preferred during preference assessments are likely to result in increased engagement by adults with dementia when used as part of an environmental enrichment program.

Replication of treatment effects is a vital component for developing the external validity of research findings and for developing evidence-based practice in behavior analysis. For example, effects must be published by a minimum of two different investigators or teams in order to meet the *American Psychological Association Criteria for Empirically Supported Treatments Category I* (well established treatments; Chambless & Ollendick, 2001). The

purpose of our study was to conduct a systematic replication of the paired-stimulus preference assessment conducted by Virués-Ortega et al. (2012) with people with dementia. We also systematically replicated the engagement analyses by Raetz et al. (2013) with leisure stimuli rated as highest, middle, and lowest preference to assess whether highest ranking stimuli would result in longer durations of engagement when presented non-contingently in the natural environment.

Method

Participants and Setting

Participants were seven individuals with a diagnosis of dementia (six females) living in two separate long-term residental facilities. Each facility housed up to 20 people with dementia. See Table 1 for demographic information for all participants. The home managers selected residents who could follow one-step instructions (e.g., sit down, pick your favorite), were physically or verbally able to make a selection between stimuli, and had normal or corrected-to-normal vision. All participants had intact vocal-verbal behavior repertoires. However, their verbal behavior was not always under stimulus control of the preceeding discriminative stimuli. For example, when asked, “what do you like to do?” Anne answered, “oh yes, that’s great isn’t it?” Sessions occurred in public areas of the facilities with a staff member present, outside of mealtimes, between 10:00 a.m. and 12;30 p.m., and 2:00 p.m. and 5:00 p.m. To avoid the effects of satiation impacting selection of edible stimuli, preference assessments occurred a miniumum of 30 minutes after a participant finished a meal. There were 56 trials in total, and no more than 15 trials occured in one session unless continuation was requested by the participant. No more than two sessions were conducted per day with each participant.

Measurement and Interobserver Agreement

During the preference assessment, the percentage of trials in which a stimulus was selected by the participant was measured. |Selection was defined as either physically

touching, pointing towards, grabbing, or vocally naming the item. During the engagement analysis, the duration of engagement with the item during the 5-minute session was measured. The definition of engagement by Raetz et al. (2013) was used; any physical contact with the item or orientation to the item, depending on the typical use of the item. Data were recorded by a second trained observer during 93% of preference assessment trials and 56% of engagement analysis trials, Inter-observer agreement (IOA) was measured by dividing the number of trials in which both observers agreed by the total number of trials for the preference assessment. IOA was calculated for the engagement analyses by dividing the smaller recorded duration by the larger recorded duration and multiplying by 100%. Mean IOA was 100% for the preference assesment trials and 99% (range 93% to 100%) for the engagement analysis. Procedural integrity (PI) data were recorded in 40% of sessions by a second observer. The observer scored whether the experimenter accurately presented each trial, represented the trial if the participant did not respond, and asked for the item back after 1 min. Mean PI was 100% and was calculated by recording the percentage of steps of the procedure implemented correctly.

Procedure

Eight stimuli per participant were selected, based on discussions with the participant, their family, or staff. Items from the Pleasant-Events Schedule-AD (PES-AD; Teri & Logsdon, 1991) were used to assist discussions. The PES-AD is an inventory of age-appropriate activities designed to help caregivers identify stimulus events that may be reinforcing for people with dementia. Four edible items and four leisure items were identified for each participant. The mini-mental status examination (MMSE; Folstein, Folstein, & McHugh, 1975) was completed with each participant before the start of the preference assessment.

Paired-stimulus preference assessment. The experimenters conducted a paired-stimulus preference assessment (Fisher et al., 1992) with each participant. Each stimulus was

presented with each other stimulus twice in randomized order; once on the left side of the participant's visual field and once on the right. Before the start of each session, each participant was given access to each item for 1 min (or one piece of an edible item). During each trial, the experimenter sat immediately in front of the participant with a table in between them. The experimenter presented the two stimuli by placing them on the table, naming the items, and asking, "Which one would you prefer?" or a similar question. If the participant did not respond within 5 s, the experimenter repeated the instruction. The experimenter removed the item if the participant did not respond after an additional 5 s, and the next trial commenced. The experimenter delivered additional verbal prompts to make a selection because multiple participants engaged in verbal behavior such as "Oh well they're both nice, you choose" or "Offer some to everyone else first and I'll have what's left." The experimenter gave participants one portion of an edible item (e.g., one potato chip or one 5-g piece of chocolate), or 1 min of access (leisure items) when they made a choice. Only two of the leisure activities required interaction with the experimenter; the card game for Edith and the game of snap for Margaret.

Engagement analysis. After the preference assessment, the experimenter conducted an engagement analysis with three of the leisure stimuli for each individual; the highest ranked, the mid-ranked, and the lowest ranked (replicated from Raetz et al., 2013). If multiple items had the same ranking, the experimenter randomly selected one of the items for inclusion in the engagement analysis. The experimenter presented each item three times in a random order. At the start of each trial, the experimenter modeled engagement with the item for approximately 10 s, and handed the item to the participant whilst informing them, "You can (verb such as read/play/use etc)… this as long as you like. Let me know once you've finished." If the participant stopped engaging with the item, the experimenter commenced the next trial after 5 min had elapsed. If the participant asked to stop or handed the item back to the experimenter, the trial was terminated and the next trial commenced after a 5-min break.

At the end of 5 min, the experimenter asked for the item back. If the participant refused to return the item, the experimenter continued to observe until they stopped engaging with the item.

Results

Preference Assessments

The percentage of trials in which each stimulus was selected by each participant can be seen in Figure 1. For all particpants except Edith, a leisure item was the most preferred stimulus; for Julia, Margaret, and Anne, the second and third preferred stimuli were also leisure items. For Maria, Rosie, and Frank, all four leisure stimuli were preferred over all four edible stimuli. Edith's most preferred items were two edible stimuli. For all other participants, the most preferred stimulus was selected during 80% of trials or more. However, Edith selected her most preferred stimulus in 70% of trials. There were no clear patterns in the within-session or across-session data (e.g., edibles were no more or less likely to be selected towards the start of the session or in the first session) for any participant. All participants chose the leisure stimuli during 69.7% of the trials in which they were required to select between edible and leisure stimuli. When the data from Edith are excluded, this figure rises to 76.6%.

Engagement Analyses

The average duration each participant engaged with each stimulus during the engagement analysis is depicted in Figure 2. The highest, middle, and lowest ranked items were the jigsaw, crochet, and postcard for Anne; the poetry, crossword, and binoculars for Frank; the crossword, magazine, and coloring for Maria; snap, family photos, and sorting for Margaret; the history book, family photos, and music for Rosie; the painting, sorting, and sketching for Julia. Edith did not complete the engagement analysis due to declining health. For Rosie, Margaret, Frank, and Anne, the stimulus with the highest average duration engagement was also the most preferred stimulus from the preference assessment. For Julia

and Maria, the middle-ranked stimulus was engaged with for longer durations than the highest rated item. Maria engaged with the middle ranked stimulus and lowest ranked stimulus for an average of 30 s longer than with the highest rank stimulus.

Discussion

We conducted a paired stimulus preference assessment with seven participants diagnosed with dementia. For six of the seven participants, the results replicated those of Virués-Ortega et al. (2012) in that the most preferred stimuli were leisure stimuli in a mixed array with edible stimuli. For the seventh participant, the two most preferred items were edible items. Overall, there were no exclusive preferences shown, i.e., all participants selected all leisure and edible items during the preference assessment. The highest, middle, and lowest-ranked leisure item was selected for six participants (Edith was excluded due to health issues), and the average duration that each participant engaged during a 5-min session was recorded as in Raetz et al. (2013). Presentation of the highest-ranked stimulus resulted in higher durations of engagement in the engagement analysis. However, because the six participants for whom engagement analyses were conducted all preferred leisure items, the classification of an item as highest, middle, or lowest was relative to the preference for other leisure stimuli rather than overall preference. For example, the stimulus used as lowest preference for Rosie was still selected in 65% of trials. Neither engagement analyses nor reinforcer assessments with edible stimuli were conducted; therefore, we cannot determine the relative reinforcing effects of leisure stimuli over edible stimuli when presented concurrently. However, the preference for leisure items over edible stimuli, and continued engagement with leisure items during the engagement analyses would suggest that the leisure items were reinforcing for all participants. As this study focused on the use of preferred items in environmental enrichment programs, future research in this area could include the use of reinforcer assessments alongside the engagement analyses to determine if the items identified

as more preferred may function as reinforcers in behavior-change interventions. Additionally, future research should include engagement analyses that are open-ended rather than limited to 5 min to measure the actual time residents are likely to spend engaged with an activity.

There are a number of reasons why Edith may have preferred edibles over tangibles. During the study, Edith engaged in verbal behavior that suggested there was faulty stimulus control regarding the purpose of the study. Edith indicated that she thought the experimenters were doing a 'taste test' for market research purposes, often verbally comparing a piece of one edible item to the same edible item and reporting if she thought it tasted better or worse. Despite our attempts to explain otherwise, her verbal rule regarding partaking in a taste test may have acted as a transitive conditioned motivating operation (CMO-T) for selecting edible stimuli so that she could give her opinion. Additionally, throughout the study, it was suspected that there was a deterioration in Edith's dementia and physical health. Because it is not possible to control for factors such as these or necessarily measure them objectively, the potential effects that these factors may have had on her selection responses were not able to be analyzed.

During the preference assessments, many of the participants engaged in what might be termed 'polite social verbal behaviors' such as offering the edible items to other residents, responding to the instruction to choose with phrases like "Oh well they're both lovely, you choose," or reporting that they did not want to appear greedy by taking everything. This was not an entirely unfounded verbal rule because in one instance, a staff member not aware of the study jokingly commented, "Why is it every time I come in here you're stuffing your face?" The perceived, or in some cases actual, social punishment (i.e., embarrassment) may have affected participants' selections, and participants may have experienced negative reinforcement for selecting leisure over edible items. For Anne in particular, 'polite social verbal behaviors' occurred in nearly every trial, and she required reassurance from

experimenters (confirming that she was not depriving others or that experimenters were interested in her choice) to select a stimulus.

It may be that older adults with dementia are more likely to select leisure items than edible stimuli due to dementia-related deterioration in sensitivity to edible stimuli (Steinbach et al., 2010). However, it may be that a preference for leisure items is simply a reflection of typical preference by older adults for conditioned over unconditioned reinforcers, and that the presence of dementia does not have an effect on preference. It would be interesting to compare these results with the results of preference assessments with older adults without dementia to see whether both groups prefer leisure stimuli.

Preference for leisure items was likely influenced by the quality of the stimuli and their availability outside the assessment. During the preference assessment, Frank verbally reported that he "could have tea any time," and this is why he chose the other item. Edith mentioned that she chose bread with a luxury brand butter because it was more expensive. Some of the participants also reported that they were choosing a particular item depending on what they had chosen recently (e.g., "I've already had that one so I'll choose this one instead") or that they wanted to complete the activity (e.g., "I want to finish off the crossword, so I'll choose that one"). Sessions occurred at least 30 minutes after the participant had eaten to mitigate the effects of satiation. Future research would benefit from longer and more consistent durations between the times that participants consume food and data collection to control for the effects of abolishing operations on selections made during the preference assessment. This is of particular importance with older adults with dementia because there is evidence of slowed metabolism related to both aging and to major neurocognitive disorders (Nifli, 2018).

Interestingly, both Frank and Anne lacked skills related to their most preferred stimuli. One of Frank's most preferred stimuli was a book of maps, but his glasses were missing during the study and he could no longer read the text. However, he continued to

select the book. Similarly, Anne's most preferred stimulus was the jigsaw, but she was unable to put any of the pieces in place at the start of the experiment. For these two participants, it is suspected that their choice was influenced by their covert verbal rules about preferences developed over a long learning history; a unique aspect of working with adults who have intact vocal-verbal repertoires. Over the course of the study, Anne's ability to complete the jigsaw improved significantly. During the engagement analysis, she completed the puzzle independently, engaging with the jigsaw for the full 5-m analysis and for 25 min after the session had ended. Given her improved performance with access to the materials, it seems reasonable to include stimuli, for which a participant has lost related skills in preference assessments with adults with dementia.

Finally, adults with dementia are likely to have long learning histories in which leisure items have been accompanied by social stimuli, and this may result in leisure items being more preferred. Preference for leisure items may be particularly strong if there is an establishing operation for social reinforcement due to the environment in which a participant is living (e.g., staff may be busy and other residents may not have the skills to engage in reinforcing conversational behaviors). For example, Margaret's most highly preferred stimulus was playing snap with the experimenter. Accompanying social interaction was not controlled for, and previous researchers have demonstrated the reinforcing value of attention during preference assessments as a variable that affects preference with adults with dementia (Oleson & Baker, 2014). Future research could directly compare the results of preference assessments in which leisure items are available with or without accompanying social attention to evaluate whether the leisure item or contingent social attention is the more reinforcing stimulus. Additionally, identifying activities with which the resident will engage for long durations without staff present is a socially significant goal in long-term residential settings where staff are often required to complete other tasks and cannot provide undivided attention.

All participants in this study had an MMSE score that placed them in the 'moderate' range of cognitive impairment. This was not intentional and was likely a by-product of the care home managers' selection of individuals suitable to participate in this study. Selecting individuals with fewer impairments and intact vocal-verbal repertoires for participation may have been intentional because the managers may have presumed it would be easier to conduct assessments with these individuals rather than those with more significant impairments. Future research should examine if preference for leisure items is found with adults with dementia who have more significant impairments to investigate whether conditioned reinforcers become less valuable as skill deficits increase.

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Table 1

Demographic Information for Each Participant

Name	Age	Sex	Ethnicity	Diagnosis	MMSE Score (severity)
Frank	82	Male	Caucasian	Alzheimer's Disease	17 (moderate)
Anne	90	Female	Caucasian	Mixed type dementia	10 (moderate)
Edith	91	Female	Caucasian	Vascular dementia	13 (moderate)
Margaret	87	Female	Caucasian	Alzheimer's Disease	11 (moderate)
Rosie	91	Female	Caucasian	Alzheimer's Disease	10 (moderate)
Julia	92	Female	Caucasian	Vascular dementia	10 (moderate)
Maria	78	Female	Caucasian	Alzheimer's Disease	13 (moderate)

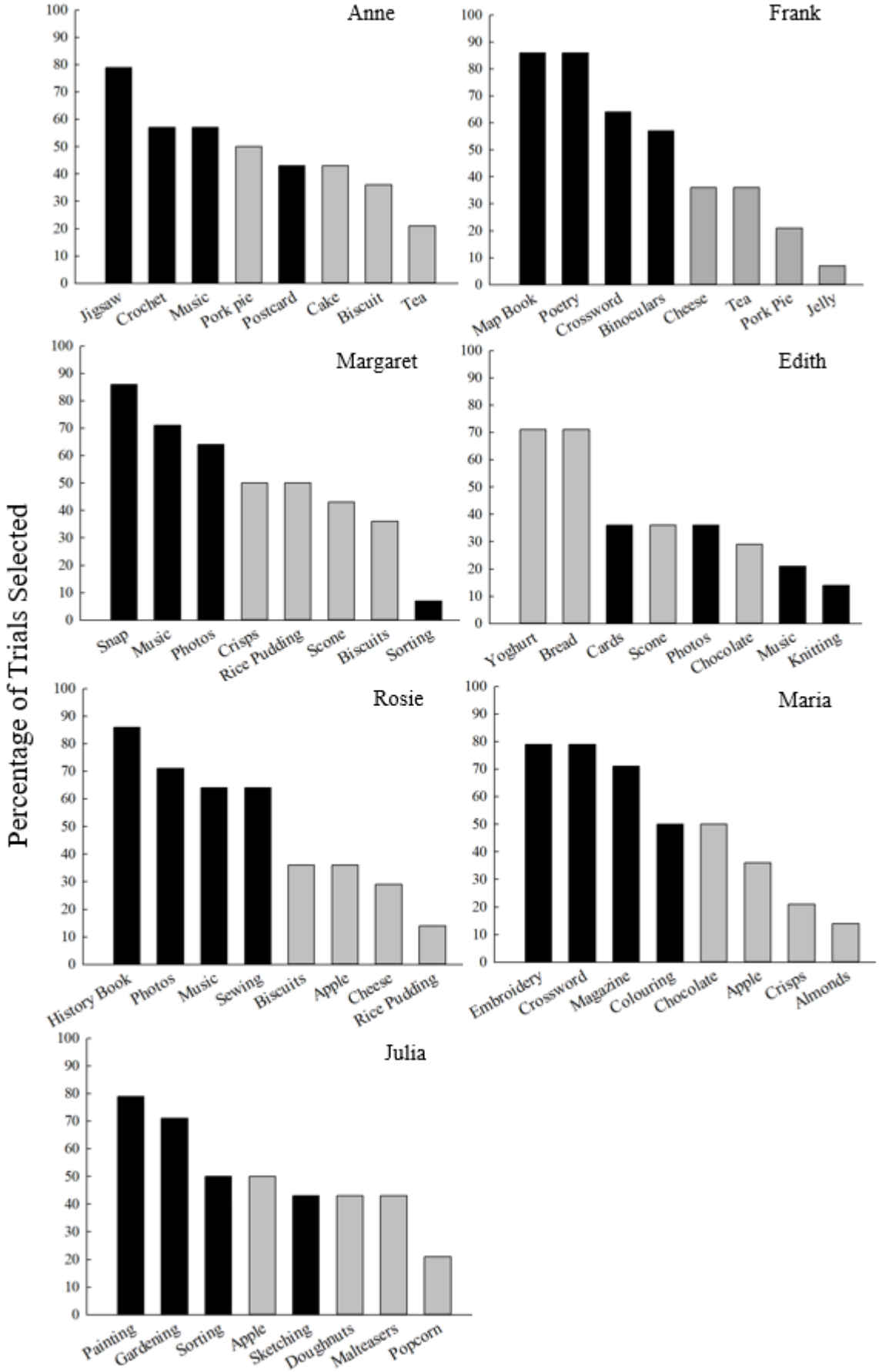
Percentage of Trials Selected
Anne
Jigsaw
Crochet
Music
Pork pie
Postcard
Cake
Biscuit
Tea
Frank
Map Book
Poetry
Crossword
Binoculars
Cheese
Tea
Pork Pie
Jelly
Margaret
Snap
Music
Photos
Crisps
Rice Pudding
Scone
Biscuits
Sorting
Edith
Yoghurt
Bread
Cards
Scone
Photos
Chocolate
Music
Knitting
Rosie
History Book
Photos
Music
Sewing
Biscuits
Apple
Cheese
Rice Pudding
Maria
Embroidery
Crossword
Magazine
Colouring
Chocolate
Apple
Crisps
Almonds
Julia
Painting
Gardening
Sorting
Apple
Sketching
Doughnuts
Malteasers
Popcorn

Figure 1. The percentage of trials in which each leisure stimulus was selected by each participant during the paired stimulus preference assessment. Black bars represent leisure items, grey bars represent edible items. The name of each participant is located at the top right of each panel.

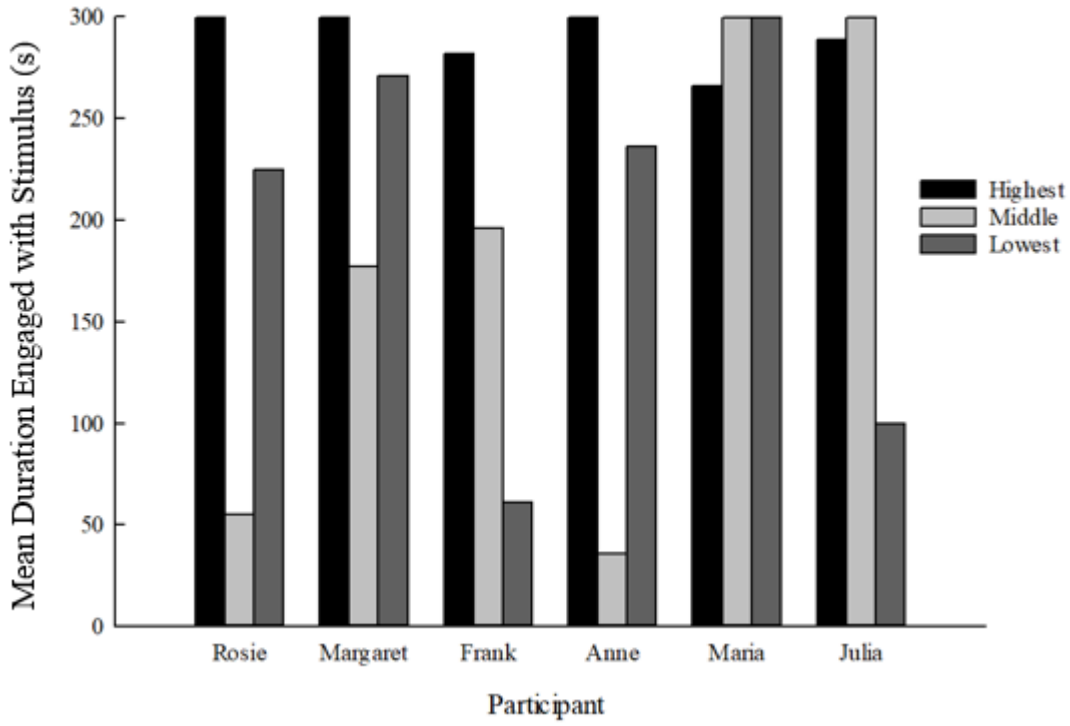

Figure 2. The mean duration that each participant engaged with the highest, middle, or lowest ranked items from the preference assessment.